

## Welcome to RibbonFlex Pro™ LED Tape Lighting

Ultra thin and flexible, RibbonFlex Pro™ white LED lighting is easy to install in straight, curved and irregular spaces – offering virtually limitless design and installation possibilities. Using Everlight™ high performance solid state lighting technology, light output, color accuracy and LED brightness are exceptional. Fully dimmable and designed to cast a seamless glow, RibbonFlex Pro creates warm and relaxing environments or delivers bright task lighting.

### 60 White LEDs per meter (18 LEDs per foot), model # RF3528060

Good, all-around solution for accent lighting and lower brightness task lighting.

- Over, under and inside cabinets, and in toe kick areas
- Indirect lighting for coves and tray ceilings
- Edge lighting under counters and shelving perimeters
- Use in displays and bookcases
- Creative lighting for objects and artwork

### Please read these guidelines completely before installing.

RibbonFlex Pro LED tape is a new and exciting type of lighting. It is important to read these guidelines completely to understand how the product works, and how it can be configured, cut to size, connected, and installed so you can design your LED lighting layout.

**Installing tape lighting is an easy DIY project, however, basic wiring skills such as stripping, splicing, extending, and connecting wires are required.**

This product operates on low voltage 12V DC power. 12V DC power supplies are sold separately and are available in different wattages.

Visit [armacostlighting.com](http://armacostlighting.com) for additional installation tips and ideas plus FAQs and latest product information.



#### Cut to Size

*Offers unlimited lighting design options for custom installations.*



#### Connect with Ease

*Use LED Snap Connectors to join strips and add power wires.*



#### Peel and Stick

*Simply remove 3M backing from LED tape lighting and stick in place.*

### IMPORTANT

- Use only with low voltage 12V DC power source
- Do not stare directly into the LED lights when illuminated
- Do not power LED tape while coiled on reel
- Disconnect power supply before cutting and connecting
- Always observe polarity for 12V connections, positive (+) to positive and negative (–) to negative
- Do not install this product in wet locations
- Use only insulated staples, plastic ties, or wire support clips to secure cords and wires
- Route and secure wires so they will not be pinched or damaged
- For any wire runs inside of walls, use properly certified CL2 or better cabling
- Do not install Class 2 low voltage wiring in the same runs as AC main power. If AC and low voltage wires cross, keep them at 90-degree angles

**All wiring must be in accordance with national and local electrical codes, low voltage Class 2 circuit. If you are unclear as to how to install and wire this product, contact a qualified professional.**

## Planning

RibbonFlex Pro LED lighting is designed for indirect lighting applications. The light from the LED tape is not to be seen directly by the eye. Every installation is unique and the illumination effects are personal preference. Installation location, wall colors, mounting angle, and the light's reflection off of walls, surfaces and objects will affect the final lighting appearance.

### Installation considerations

- Where will you locate your power supply?
- How will you switch your LED lighting on and off?
- What is the best layout configuration for your installation?
- How will you run and conceal the wires to your LED tape lighting?

### Power supply location and voltage drop

The power supply that provides 12V DC power to your LED tape lighting operates on 120V AC household current. The shorter the wire lead between the power supply and the LED tape lighting, the brighter the lights will be. If the lights farthest from the power supply appear dim, it is due to voltage drop.

### About voltage drop

Voltage drop is a natural occurrence in all low voltage lighting systems. It is the gradual decrease in voltage that occurs along the length of the 12V power feed wires to the lighting, and varies depending on the type and size of the LED tape light installation. It is a function of wire length, wire thickness, and the energy or total watts used by the lighting.

Voltage drop only becomes undesirable if you notice the brightness in one area of your lighting is objectionably different than in another area. As a practical approach, test your lighting prior to final installation. Refer to the chart below for recommended lengths of power feed wires using 22 and 18 AWG wires.

**Excessive voltage drop = reduced brightness and color accuracy**  
**Shorter and/or thicker wires = higher brightness and color consistency**  
**Longer LED tape = an increase in voltage drop**

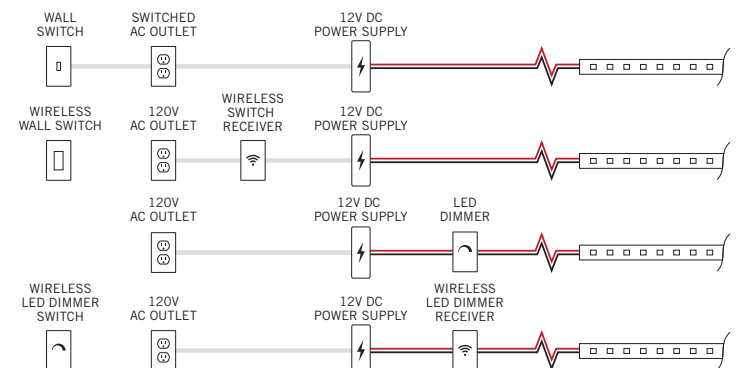
Recommended maximum length of 12V power wires from power supply to LED lighting			
22 AWG WIRE		18 AWG WIRE	
If your LED tape light length is:	Max wire length to tape light	If your LED tape light length is:	Max wire length to tape light
12 Feet	10 Feet	12 Feet	20 Feet
24 Feet	8 Feet	24 Feet	16 Feet
36 Feet	6 Feet	36 Feet	12 Feet
48 Feet	4 Feet	48 Feet	8 Feet

For an online voltage drop calculator, visit [armacostlighting.com/installation](http://armacostlighting.com/installation).

### Switching and dimming options

If you do not have a switched 120V AC outlet for your LED power supply, consider an optional Armacost Lighting wireless wall switch or LED dimmer switch.

### TYPICAL CONNECTING AND SWITCHING OPTIONS



**Interior RV and boat applications can be powered directly by 12V battery**



## Configuration options

RibbonFlex Pro offers endless connection options to fit virtually any installation imaginable. LED tape strips can be installed in series (strips connected or wired end to end) or in parallel (multiple legs of LED strips or series of strips wired directly to a single power supply).

TYPICAL CONFIGURATIONS	
<b>Straight Run</b>	
Only one end of the LED strip is powered. Multiple strips can be connected in a series for a continuous run. LEDs farther away from the power supply may appear dimmer due to voltage drop, especially if longer wires are used in between to connect strips.	
<b>Center Feed / Loop Back</b>	
Either power two equal legs of tape lighting from the center or loop back and power both ends of the LED tape. These configurations will produce more consistent brightness and color over the length of the strip. A loop back is excellent for room perimeter tray ceiling or cove lighting.	
<b>Array</b>	
An array uses two or more legs of various lengths wired to a power supply in a parallel connection. You will need to calculate total wattage used in an array to guard against overloading the power supply.	

## Choosing a power supply

LED tape lighting power requirements are based on several factors, including your configuration (chart above), voltage drop, and the length limitations of the LED tape lighting. Refer to the charts below for the recommended maximum lengths of LED tape lighting based on your configuration and choose a power supply rated greater than your needs – you cannot overpower LED tape lighting. The LED power requirements shown below are based on 100% full power brightness levels and do not represent every possible installation scenario.

Maximum length of LED tape based on configuration type and power supply		
Power Supply	Straight Run	Center Feed / Loop Back
6 Watt	3.3 ft (1.0m)	Not recommended
15 Watt	10.5 ft (3.2m)	9.0 ft (2.75m)
30 Watt	24.0 ft (7.3m)*	20.0 ft (6.0m)
60 Watt	24.0 ft (7.3m)*	48.0 ft (14.6m)

\*Length limitations indicated here are based on the inherent limitations of the LED tape due to voltage drop in a straight run. Exceeding these lengths will cause LEDs farthest from the power supply to appear dimmer. A higher wattage power supply will not reduce the impact of voltage drop. For more consistent brightness consider a center feed or loop back configuration.

### Array power supply calculation

Due to voltage drop, longer lengths of LED tape will use fewer watts per foot than shorter lengths. The total watts used in an array layout depend on the wattage requirement of each leg and overall voltage drop within your connection wires. A leg can be a single LED strip or series of strips connected end-to-end. Various legs are wired in parallel directly to the power supply.

Calculate the wattage for each leg by multiplying watts per foot by the length of LED lighting in the leg. Include only the lengths of LED tape in your calculation, not the connecting wires. Add each leg's wattage requirement together to determine the total watts needed to power your array and select the appropriate power supply.

Length of leg (LED tape light only)	1 to 5 feet	6 to 10 feet	11 to 15 feet
Watts used per foot	1.8 watts/ft	1.6 watts/ft	1.4 watts/ft

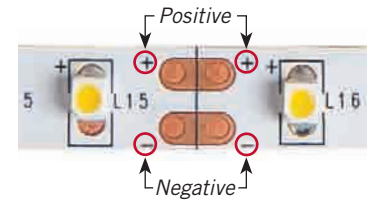
Calculate each leg's wattage requirement separately, then add together for the total watts needed for your array. Select a power supply that exceeds the total watts needed.

## Cutting, connecting and wiring

RibbonFlex Pro is designed for custom lighting installations. Basic wiring skills such as stripping and splicing wire connections are required.

**Always maintain polarity when connecting LED tape lighting and low voltage power wires.**

Be sure to connect positive wires to positive (+ to +), and negative wires to negative (– to –). Polarity is easily identified with + and – marking on LED tape as shown.



### Cut with scissors

This tape light model can be cut every 3 LEDs, or about every 2". Only cut tape light in the center of the copper pad locations, "A," as shown below. If you cut at a soldered position, "B," also shown, you may need to remove the solder from the tape connection joint in order for an LED Snap Connector to work properly. Solder joint positions are located every 19.7 inches (½ meter).



### LED Snap Connectors make easy, secure solderless connections

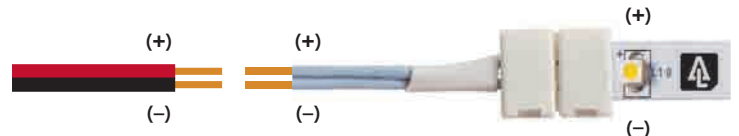
#### Wire Lead Snap Connectors

Wire Lead Snap Connectors are used for going around corners or, when cut in half, to create two power leads ("jumper" cables) for linking and extending power wires to LED tape lighting in other areas.

**IMPORTANT:** Always use the + / – indicators printed on the tape light to maintain polarity (+ to +, – to –).



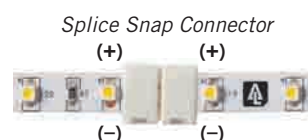
To get power from one LED strip to another, you can extend wire leads as shown below. 22-18 AWG wire should be sufficient for extending wire leads up to 10 feet. Shorter and/or thicker wires will mean less voltage drop and higher brightness. For an online voltage drop calculator, visit [armacostlighting.com/installation](http://armacostlighting.com/installation).



**Wire splice connections:** Maintain polarity when extending cables and be sure all splice connections are secure. Splicing options include crimp connectors, wire nuts, terminal blocks and soldering wires. Be sure to use wire connectors that are sized for the wire gauge you are using.

### Splice Snap Connectors

Splice Snap Connectors are for joining two strips to create a continuous run of LED lighting.

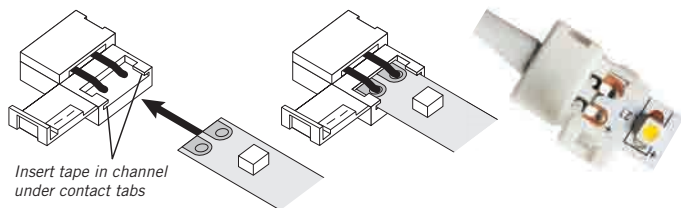


If the + / – marks do not line up, flip the tape and use the opposite end for proper alignment.

### How to use Snap Connectors

- Pry open lid on the side you wish to connect an LED strip to.
- Peel back about ¼ inch of the 3M adhesive backing on the bottom of the strip.

- Using a side-to-side motion, carefully slide tape strip into connector channel as shown below so the copper pads on the tape are positioned underneath the connector contacts.
- Close and snap down lid connector.
- Perform a power test to be sure connection is secure and that all LEDs light before final installation.
- If LEDs do not light, or LEDs flicker, repeat the steps outlined above.



### You can also solder lead wires to LED tape

LED strips can be direct wired by soldering leads onto the copper pads as shown. Test light connection, then seal with  $\frac{3}{16}$ " heat-shrink tubing.



## Installation

Every lighting situation is different. Where you decide to mount and position the LED tape is a personal preference that will affect the illumination appearance.

**Before removing 3M backing tape, test fit and light your RibbonFlex Pro in the space you intend to install the lighting.**

Power your LED tape lighting and temporarily hold or tape into position with masking tape – do not remove backing tape. Move the tape light around and try various angles and positions to get the desired level of illumination and lighting appearance. If the LEDs create undesirable light spots on walls, or reflections, reposition LED tape light strip farther away from surfaces or try a different mounting angle.

### Final Mounting

Once you have determined your final mounting position, clean the surface to assure the 3M self-adhesive backing will adhere properly. The mounting surface needs to be smooth, dry, and free from oils and waxes. Denatured alcohol or acetone can be used; be sure to read labels carefully as some solvents can damage certain surfaces.

Remove the 3M backing from one end and carefully place the tape light along the surface mount area. Using a cloth, gently press between the LEDs to help ensure secure contact with the surface. Avoid pressing on the individual LEDs as this could damage the LED solder connection to the tape.

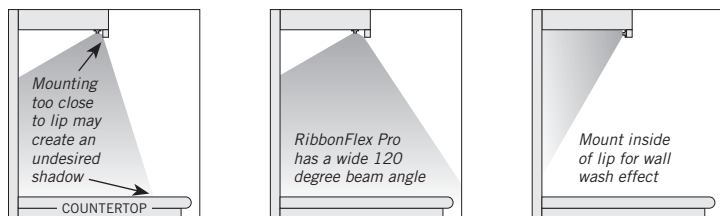
Support the 12V power feed wire using peel-and-stick wire support clips as shown.



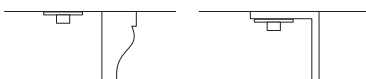
Although RibbonFlex Pro can be installed in curved and irregular spaces, avoid sharp bends or bending on the solder joints as you could damage the LED tape light. If an LED is inadvertently damaged and fails to light, the remaining LEDs will continue to operate. RibbonFlex Pro is made with 3 LEDs connected as one series. If you experience a failure, you can cut out and remove the damaged 3-LED series and splice together new LED tape.

### Under Cabinet

To surface mount LED tape lighting under a set of cabinets in one continuous run, you may need to drill a  $\frac{1}{2}$ " hole through any cabinet side lip that may be present. Install LED tape lighting through the hole and surface mount as a continuous run.

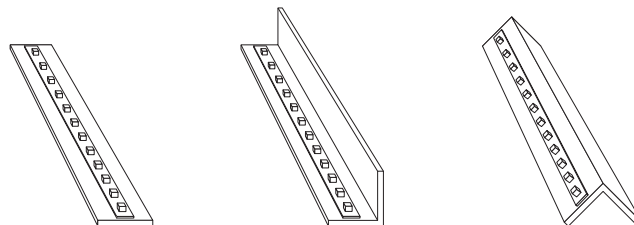


When mounting under a cabinet or a shelf with no lip to hide the LED tape light strip, create a visual barrier by using trim strip molding mounted in front of the LED tape light.



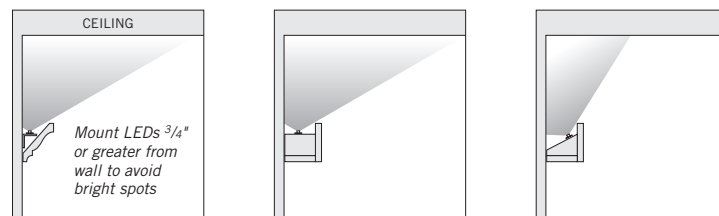
### Above Cabinet Uplighting

Most cabinet tops have uneven surfaces. To create beautiful indirect uplighting over cabinets, simply mount RibbonFlex Pro on any rigid strip (e.g., thin lattice or corner guard molding) and place on top of cabinets. Angle the strip position to achieve the desired illumination.



For a seamless glow and to avoid bright light spots, keep LED tape light strip at least  $\frac{3}{4}$ " away from walls.

### Cove Lighting



## Troubleshooting

### Tape light strip does not light

- Make sure your LED power supply is turned on and receiving power.
- Confirm you have maintained correct polarity (+ to + and – to –) when joining LED strips as well as when connecting to the 12V power supply.
- Check all tape light connections and any switch or dimmer connections from the power supply to the LED tape light. Consider testing with a multimeter to ensure light strip is receiving 12V power.

### Only part of the LED tape light strip is lit

- Check connections to the part of the strip that is not lit.
- Confirm that you have maintained correct polarity to the unlit section.
- If only 1 LED series is out, cut out and remove the damaged 3-LED group and splice together LED tape strips or replace with new 3-LED section.

### LED tape lights blink on, then go off

- Your power supply is not adequate for the length of LED tape light you are powering. Install a higher wattage power supply or reduce watts used by shortening the lengths of your LED tape lighting.

### LEDs farthest from the power supply are noticeably dimmer

- This is the result of voltage drop. Decrease the length of the 12V power feed wires or use thicker power feed wires between the 12V power supply and the tape lighting.
- Use shorter lengths of LED tape lighting. Refer to **Configuration options** in these guidelines. Consider a different configuration.

Visit [armacostlighting.com/installation](http://armacostlighting.com/installation) for additional installation tips and FAQs.

## Limited 3-year warranty

This product is for dry location use only. Improper installation, improper powering, abuse, or failure to use this LED tape light for its intended purpose will void warranty. LED tape light cannot be returned or exchanged once cut unless under warranty replacement. Proof of purchase is required for all returns. Questions? Email [support@armacostlighting.com](mailto:support@armacostlighting.com).

### SPECIFICATIONS

Input Voltage.....	12V DC
LED Count .....	60 LEDs/m
LED Module .....	Everlight SMD 3528
Chip Size.....	10 x 23μ
Beam Angle.....	120° wide
Tape Height/Width .....	2 x 8mm
Cuttable.....	Every 2" approx (50mm)
Lumens Per LED.....	Approx 7 lm
Color Temperature (CCT).....	~3000
Color Accuracy (CRI).....	~79
Listings .....	CE, RoHS, CSA

**Armamcost**  
LIGHTING

140 Baltic Avenue  
Baltimore, MD 21225

[armacostlighting.com](http://armacostlighting.com)

© 2012 Armamcost Lighting.  
All rights reserved.

rev 12.12